EVEREX

Everdisk™
internal/external hard disk subsystem (XT compatible)

OWNER'S MANUAL AND REFERENCE GUIDE
(VERSION 1.5)

EVER for EXcellence

MAN-00007-15

Everdisk™
internal/external hard disk subsystem (XT compatible)

OWNER'S MANUAL AND REFERENCE GUIDE

EV-300S
EV-390
EV-391
(VERSION 1.5)

EVEREX SYSTEMS, INC.
48431 MILMONT DRIVE
FREMONT, CA 94538

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Warning

Class B: Computing Device

WARNING: This equipment generates and uses radio frequency energy and if not installed and used in strict accordance with the manufacturer's instructions, it may cause interference to radio and television reception. The product has been certified and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Ensure that card mounting screws, attachment connector screws, and ground wires are tightly secured.
2. Reorient the computer with respect to the receiver.
3. Move the computer away from the receiver.
4. Plug the computer into a different outlet so that computer and receiver are on different branch circuits.
5. Reorient the receiving antenna.

This product requires the use of shielded cables and connectors for proper installation and connection to peripheral devices. Shielded cables are available from authorized dealers. The manufacturer is not responsible for any radio or television interference caused by using other than the recommended cables or by unauthorized modifications to this equipment.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio TV Interference Problems." This booklet is available at FOB Public Contact Branch, Room 725, 1919 M St. NW, Washington, DC 20555, Telephone: (202) 634 - 1940, Stock No. 004-000-00345-4 (FCC, Part 15.838 b).

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Check List

Your hard disk subsystem carton should contain these items:

Internal Subsystem

- Hard disk drive controller board
- Hard disk drive
- 34-pin ribbon cable (Carries control signals to the hard disk drive) - Optional
- 20-pin ribbon cable (Carries data between the hard disk drive and the computer) - Optional
- 34-pin floppy disk ribbon cable (ONLY EV-390 controller)
- Half-height bezel (a full-height bezel is available as an option)
- Metal mounting brackets
- Set of screws

- A utility diskette containing the following files :

  SHIPDISK.EXE
  FMTDRIVE.EXE
  EVEREX1.EXE
  FIXFMT.EXE

- Owner's Manual and Reference Guide
- Owner Registration and Warranty Card

External Subsystem

- Hard disk drive controller board with an external connector on the mounting bracket
- Hard disk drive in a chassis
- 34-pin floppy disk ribbon cable (ONLY EV-390 controller)

- A utility diskette containing the following files:

  SHIPDISK.EXE
  FMTDRIVE.EXE
  EVEREX1.EXE
  FIXFMT.EXE

- AC power cord (ONLY for external subsystems with a power supply)

- 37-pin connecting cable

- Owner's Manual and Reference Guide

- Owner Registration and Warranty Card

DISCLAIMER: WHILE WE DO OUR BEST TO AVOID SUCH A SITUATION, EVEREX SYSTEMS WILL NOT BE RESPONSIBLE FOR ANY LOSS OF INFORMATION RESULTING FROM THE USE OF THE PRODUCT.

Introduction

BEFORE YOU BEGIN

Before installing your new Everdisk Hard Disk Subsystem, please read through this Owner's Manual thoroughly. This Owner's Manual gives you all of the information you need to install and operate your Everdisk Hard Disk Subsystem. If you have any questions which are not answered in this manual, please contact your local Everex dealer.

REMEMBER: "If all else fails, read the instructions".

INTRODUCING THE HARD DISK SYSTEM

The Everex Hard Disk subsystem offers superior performance, reliability, and rugged construction in microdisk storage technology. The Everdisk Hard Disk subsystem:

- Comes complete with controller, drive, and software for easy installation.
- Provides full compatibility with DOS 2.0, 2.1, 3.0, and 3.1.
- Allows you to boot directly from the hard disk without a software patch.
- Allows you to connect two hard disk drives of different capacities to the controller board.

System Requirements

- IBM PC, XT, or compatible
- Minimum 128K of user memory
- IBM PC DOS 2.0 or later (If you are using the PC 1 [64K CPU] refer to the section on PC1 installation.)

Please refer to the appropriate section below for special requirements of your particular computer system.

The IBM portable...

- IBM portable front bezel for the hard disk drive (optional)
- Short mounting screw (Do not use the mounting screw from your floppy.)

The COMPAQ Portable...

- COMPAQ DOS 2.11 or later OR IBM PC DOS 2.1 or later
- Full height front bezel OR half height drive with COMPAQ mounting cage
- Mounting retainers (optional)

The COMPAQ Desk Pro...

- COMPAQ DOS 2.11 or later OR IBM PC DOS 2.0 or later
- COMPAQ Desk Pro mounting rails
- Desk Pro power cable
- "Y" power cable (optional)

Other IBM compatible computers...

- IBM PC DOS 2.1 or later (Other versions of MS DOS may not be able to boot up directly from the hard disk.)

The following Installation Summaries are for experienced PC/XT users. We recommend novice PC/XT users follow the more comprehensive installation procedures in the Installation chapter of this manual.

INTERNAL SUBSYSTEM INSTALLATION SUMMARY

1. Make sure the drive select switch and the terminating resistor on the hard disk drive(s) are configured properly for your system. Confirm that "SW1" on the controller is configured properly.

2. Turn OFF your computer and remove the cover.

3. Locate the drive connectors (J1 and J2) on the controller board. Plug the 34-pin cable into the J1 connector, and the 20-pin cable into the J2 connector. (J3 if this is your second drive.) Align the colored stripe on the ribbon cables to pin 1 of the connectors.

4. Install the controller into a vacant expansion slot near the power supply of your PC/XT.

5. Attach the mounting bars onto the hard disk drive.

6. Slide the hard disk half-way into the drive space with the metal cover face up.
7. Connect the cables attached to the controller to the hard disk drive.
8. Connect a 4-pin power cable from the power supply to the hard disk drive.
9. Insert the hard disk completely into the drive space, and secure the drive to the PC chassis.
10. Insert the bezel into the open space on the front of the computer (if applicable).
11. Reinstall the cables and turn the computer ON.
12. Format the hard disk drive.
13. Reinstall the cover when the system is tested and working properly.

EXTERNAL SUBSYSTEM INSTALLATION SUMMARY

1. Confirm that the drive select switch on the hard disk drive is configured properly for your system. Confirm that "SW1" on the hard disk controller is configured correctly for your system.

NOTE: If the external hard disk drive is your second hard disk drive, refer to the appendix called ***One Internal and One External Hard Disk Drive.***

2. Turn OFF your computer and remove the cover.

3. Install the controller into a vacant expansion slot near the power supply of your PC/XT.

4. Plug a 4-pin power cable into the connector on the controller (if applicable).

5. Attach the 37-pin connecting cable to the mounting bracket of the controller and the other end into the connector on the external hard disk chassis.

6. If applicable, connect the AC power cord to the outlet on the external chassis, and the other end into an AC wall outlet.

7. Turn the external chassis's power ON; turn the computer's power ON.

8. Format the hard disk drive.

9. Reinstall the computer's cover when the system is tested and working properly.

Before you install your hard disk drive, make sure the drive select switch is configured properly. The select switch on the hard disk drive is set in production. However, you should still perform the described configuration procedures to insure that the drive(s) will be set properly for your system. To change/confirm the select switch on your drive, refer to the instructions that are specific to your type of hard disk drive. Look on the side of your hard disk drive for the name of the manufacturer and model number of the drive.

SEAGATE HARD DISK DRIVES

Seagate 20MB ST225, 30MB ST238, 30MB ST4038 and 40MB ST4051 Drives: the drive select switch (DS) is the 16-pin jumper J9 (see the following figure). For physical drive 1, put a jumper plug on DS1. For physical drive 2, put a jumper plug on DS2.

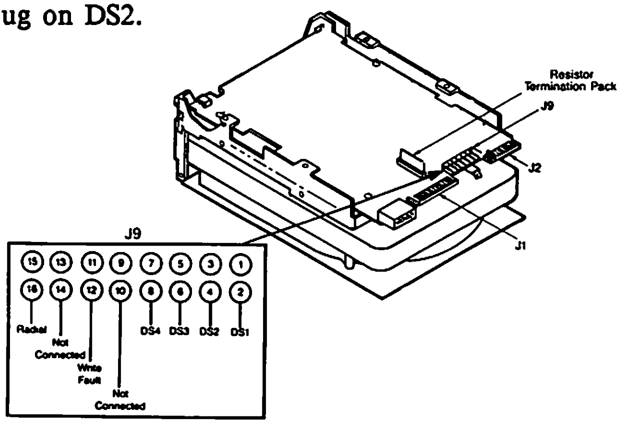

Figure 1A: 16-pin Drive Select Switch

Seagate 20MB ST4026: the drive select switch (DS) is the 8-pin jumper J9 (refer to the following figure). For physical drive 1, put a jumper plug on DS1. For physical drive 2, put a jumper plug on DS2.

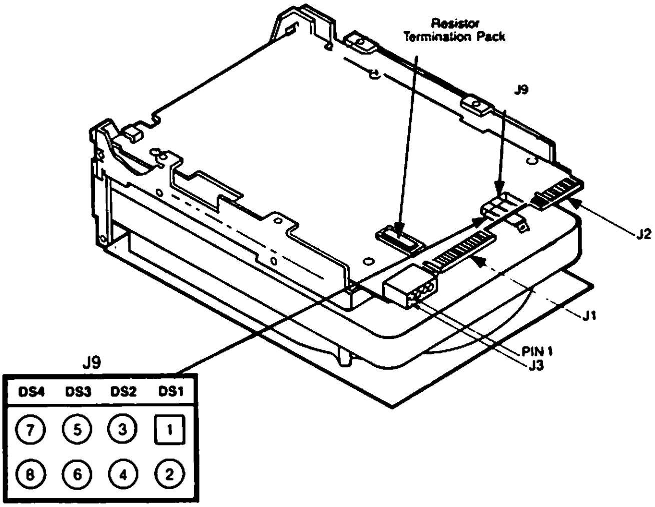

Figure 1B: 8-pin Drive Select Switch

20MB FUJI FK302-26, the drive is selected by the 4 switches on the left rear of the drive.

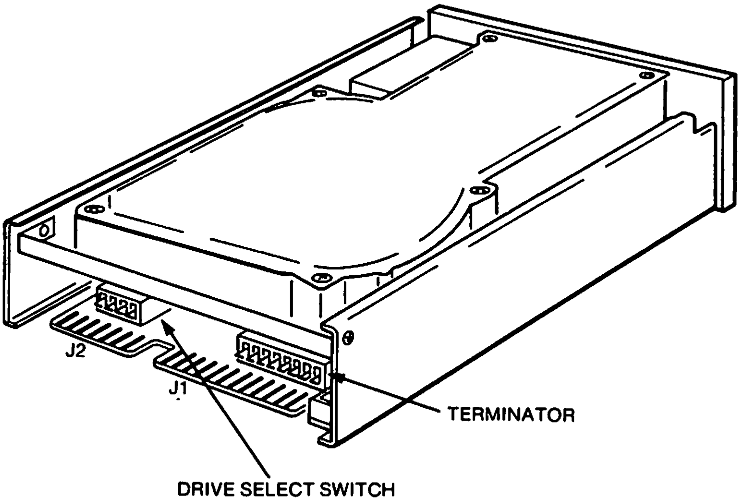

Figure 1C: Connector Locations on a Fuji Drive

SW NO.	DRIVE SELECT
4	Drive Select 1
3	Drive Select 2
2	Drive Select 3
1	Drive Select 4

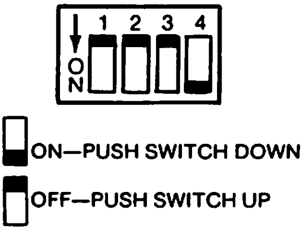

Figure 1D: Drive Select Switch (Fuji)

TABLE 1

BIOS ROM DISK TYPE SELECTION

					EPROM		
MANUFACTURER	MODEL	MB	HEADS	CYL	3.91	3.92	3.93
Microscience	612	10	4	306	A	A	A
Microscience	725	20	4	612	C	C	C
Tandon	252	10	4	306	A	A	A
Tandon	262	20	4	615	C	C	C
Tulin	326	20	4	640	C	C	C
Tulin	340	30	6	640	D	NS	NS
Fuji	302-13	10	2	612	B	B	B
Fuji	302-26	20	4	612	C	C	C
Seagate	213	10	2	615	B	B	B
Seagate	225	20	4	615	C	C	C
Seagate	4026	20	4	615	NS	C	C
Seagate	4038	31.9	5	733	NS	D	NS
Seagate	4051	42.5	5	977	NS	D*	D

NS: The EPROM chip will not support the hard disk drive.

*The ST4051 will have a capacity of 31.9 Mb when configured as D with a 3.92 EPROM.

NOTE: To upgrade a hard disk controller with a 3.92 or a 3.93 EPROM chip, you must also upgrade with a Western Digital WD1015-24 controller chip.

A NOTE ON TERMINATING RESISTORS

On the bottom side of a Seagate hard disk drive is a 10-pin plug known as a terminating resistor or a "Pull-up resistor." (See Figure 2). The terminating resistor is used for termination of input control signal lines.

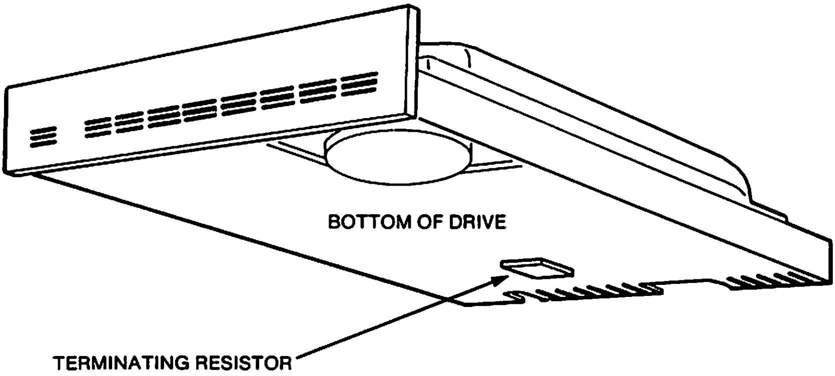

Figure 2: Terminating Resistor

If you have one hard disk drive (internal or external), leave the terminating resistor in place and go on to the chapter called *Hard Disk Controller Configuration.*

If you have 2 hard disk drives, (2 internal or 2 external), the terminating resistor needs to be placed on the hard disk attached to the end of the 34-pin daisy chain cable to insure that the hard disks will perform reliably.

If you have two hard disk drives, remove the terminating resistor on the drive that will be attached to the middle connector of the 34-pin daisy chain cable. A terminating resistor is necessary on the hard disk attached to the end of the 34-pin daisy chain cable. (See the following examples). Removing the resistor is a very easy process. Use a small screwdriver, and gently pry the 10-pin resistor off of the hard disk drive. DO NOT THROW THE TERMINATING RESISTOR AWAY. Put it in a safe place. You will need it if you ever move one of the hard disks.

CHOOSING THE CORRECT TERMINATING RESISTOR TO REMOVE

Two Internal Hard Disk Drives

If you have two internal hard disk drives, remove the terminating resistor on the drive that will be attached to the middle connector of the 34-pin daisy chain cable. A terminating resistor is required on the hard disk attached to the end of the 34-pin daisy chain cable.

One Internal Hard Disk And One External Hard Disk

If you have 1 internal hard disk drive, and 1 external hard disk drive, leave both terminating resistors in place and continue onto the chapter called *Hard Disk Controller Configuration.* The terminating resistors do not need to be removed because the hard disk drives are not attached to the same 34-pin daisy chain cable.

Two External Hard Disk Drives

If you have two external hard disk drives in a chassis, remove the terminating resistor on the drive that will be attached to the middle connector of the 34-pin daisy chain cable. If you bought both your external hard disk drives at the same time, this will be done for you in production.

The Terminator on a Fuji Hard Disk Drive

The terminator (TMN1) on a Fuji hard disk drive is an 8 switch 220/330 ohm resistor on the right rear of the drive. (Refer to Figure 1C). The resistor is used for termination of input control signal lines.

One Hard Disk

The terminator switches 1 through 8 must always be in the ON position.

Two Hard Disks

If the two hard disk drives are daisy chained, terminator switches 2 through 8 must be in the OFF position on the drive(s) attached to the middle connector(s) of the daisy chain cable.

The last drive in the daisy chain must have switches 1 through 8 always in the ON position.

NOTE: Terminator switch 1 must always be ON.

The positions of the jumpers on the controller card determine the physical characteristics (ie. number of heads and cylinders) of the drive(s) connected to the card. These jumpers are set (or configured) at the factory. However, you should still perform the described configuration procedures to insure that the hard disk controller card is set properly for your particular system.

EV-391 (TWO-THIRD SIZE) HARD DISK CONTROLLER

The EV-391 (two-third size controller) is the board most often supplied with the hard disk subsystem. The EV-391 hard disk controller can operate up to two hard disk drives, either internal or external, or a combination of both. This controller can be set to operate disk drives with various physical characteristics (i.e. number of heads and cylinders). If you have only one drive in your system, ignore the configuration settings for drive 2.

WARNING: Circuit boards are sensitive to static electricity, which may damage their delicate electronics. You can pick up static electricity by simply walking on a carpeted floor. Protect your board by "grounding" yourself. To ground yourself, touch the metal case of your computer before you pick up a circuit board, then handle the board carefully by the edges.

NOTE: If the EPROM chip on your controller card is labeled 3.91, it can not support some hard disk drives. The following drives require a 3.92 or higher EPROM chip: Seagate ST4026, ST4038, and ST4051.

CONFIGURATION OF THE EV-391 HARD DISK CONTROLLER

To set the controller for each drive, you must reposition the jumper blocks 1 through 4 on SW1. Positions 3 and 4 are used for disk drive #1. Positions 1 and 2 are used for disk drive #2. (Refer to Figure 3). Check Table 1: BIOS ROM DISK TYPE SELECTION to determine the proper configuration of SW1 for your type of hard disk drive.

EXAMPLE: If you own a Seagate ST225, and your controller has an EPROM chip labeled 3.92, configure SW1 as shown for Type C in Figure 3.

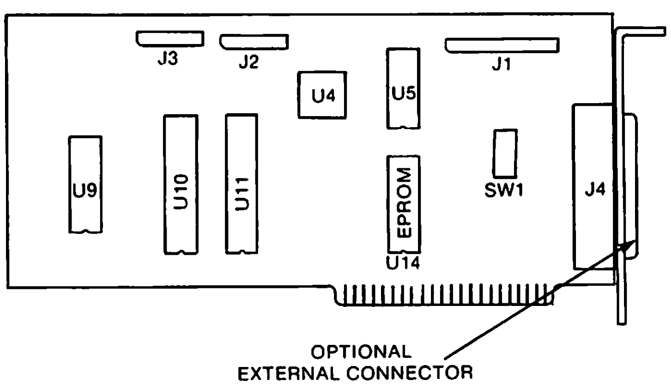

Figure 3: EV-391 Controller

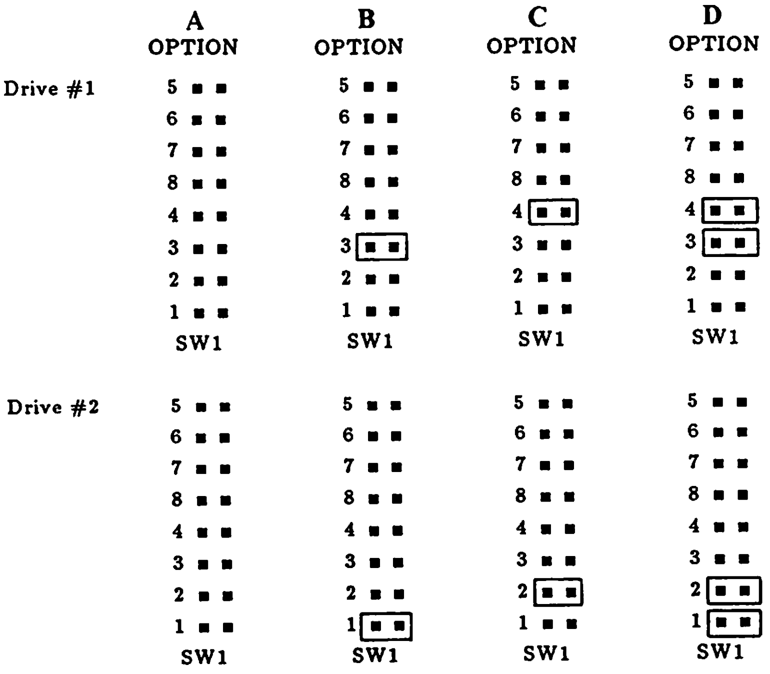

TABLE 1

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Tandon	252	10	4	306	A	A	A
Tandon	262	20	4	615	C	C	C
Tulin	326	20	4	640	C	C	C
Tulin	340	30	6	640	D	NS	NS
Fuji	302-13	10	2	612	B	B	B
Fuji	302-26	20	4	612	C	C	C
Seagate	213	10	2	615	B	B	B
Seagate	225	20	4	615	C	C	C
Seagate	4026	20	4	615	NS	C	C
Seagate	4038	31.9	5	733	NS	D	NS
Seagate	4051	42.5	5	977	NS	D*	D

NS: The EPROM chip will not support the hard disk drive.

*The ST4051 will have a capacity of 31.9 Mb when configured as D with a 3.92 EPROM.

NOTE: To upgrade a hard disk controller with a 3.92 or a 3.93 EPROM chip, you must also upgrade with a Western Digital WD1015-24 controller chip.

CONFIGURATION OF EV-300S (HALF-SIZE) HARD DISK CONTROLLER

The Everex EV-300S card is a half-size hard disk controller with a 37-pin external connector. The EV-300S can fit in any expansion slot (including the short slots) in an IBM PC, IBM XT, IBM Portable, or IBM compatible computers. The half-size controller can operate up to two hard disks, either internal, external, or a combination of both. If you have only one drive in your system, ignore the configuration settings for drive 2.

To set the controller for each drive, you must reposition the jumper blocks 1 through 4 on SW1. Positions 3 and 4 are used for disk drive #1. Positions 1 and 2 are used for disk drive #2. (See Figure 4). Check Table 1: BIOS ROM DISK TYPE SELECTION to determine the proper configuration of SW1 for your type of hard disk drive.

EXAMPLE: If you own a Seagate ST225, and your controller has an EPROM chip labeled 3.92, configure SW1 as shown for Type C in Figure 4.

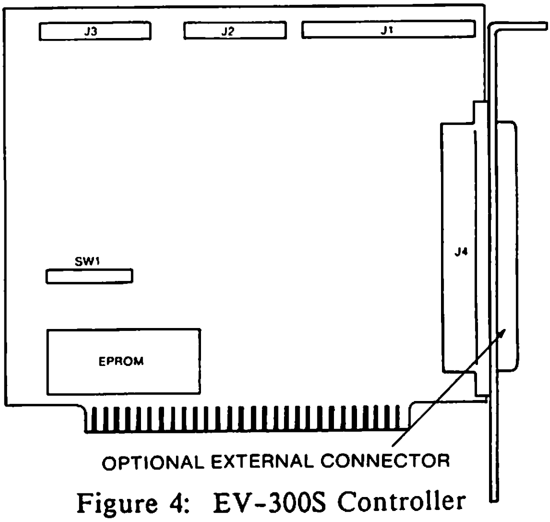
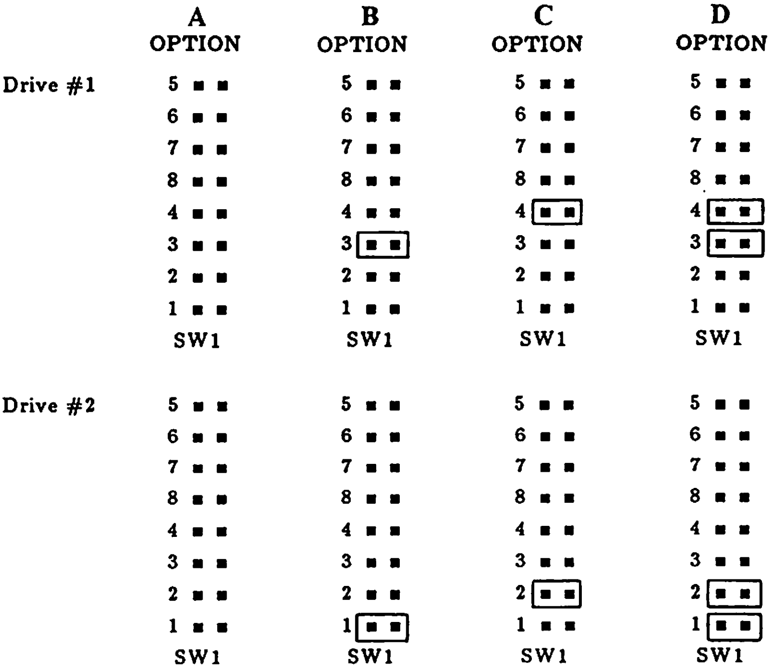


Figure 4: EV-300S Controller



CONFIGURATION OF THE EV-390 (FULL-SIZE) HARD DISK + FLOPPY CONTROLLER

The full-size EV-390 hard disk + floppy controller can operate up to four floppy disk drives, and up to two hard disk drives. IBM ROM BIOS does not support 4 floppy disk drives, therefore, the J6 drive connector is for floppy disk drives A and B. The EV-390 controller requires a full-length expansion slot.

Please refer to the appendix at the end of this manual, *Hard Disk + Floppy Controller*, for the instructions on how to install the additional 34-pin daisy chain cable to the floppy drive.

To set the controller for each hard disk drive, you must reposition the jumper blocks 1 through 4 on SW1. Positions 3 and 4 are used for hard disk drive #1. Positions 1 and 2 are used for hard disk drive #2. Note that SW1 is horizontal on the EV-390 controller. (See Figure 5). Check Table 1: BIOS ROM DISK TYPE SELECTION to determine the proper configuration of SW1 for your type of hard disk drive.

EXAMPLE: If you own a Seagate ST225, and your controller has an EPROM chip labeled 3.92, configure SW1 as shown for Type C in Figure 5.

NOTE: A jumper on chip W10 on the EV-390 controller enables the floppy drive controller. Removing the jumper from W10 on the EV-390 controller disables the floppy drive controller.

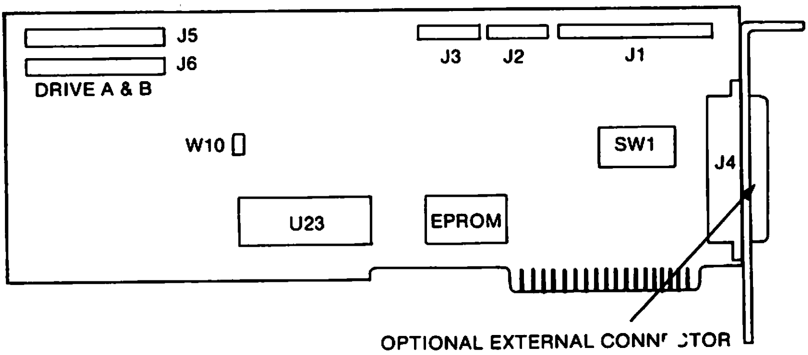
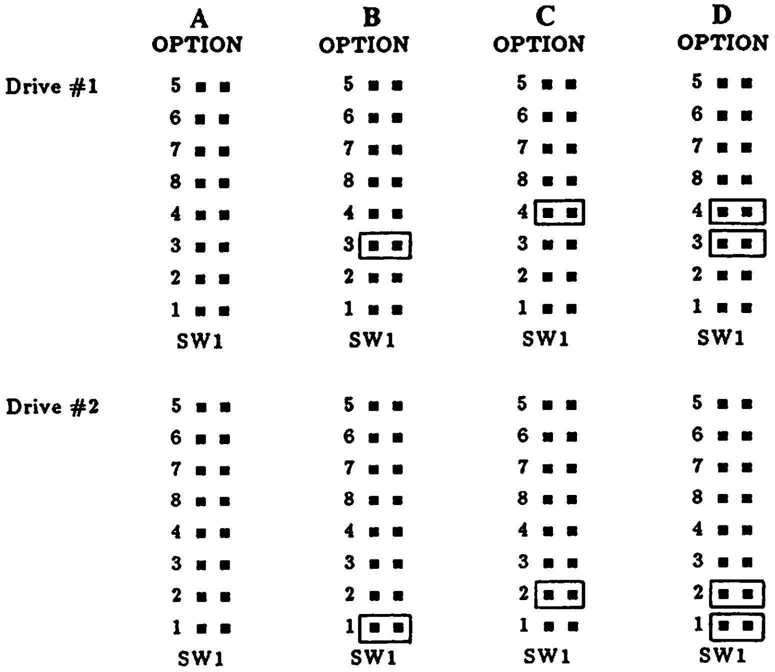


Figure 5: EV-390 Controller



CONFIGURATION OF THE ST238 CONTROLLER

The 30MB hard disk subsystem features the ST238 controller which is a half-size hard disk controller. The jumpers on this controller have already been set, but you should confirm these settings. The jumper settings and drive connectors are as follows:

Jumper Settings:

W3 - Jumper ON
W4 - Jumper ON pins 2 and 3
W6 - Jumper ON pins 2 and 3
W8 - Jumper ON pins 2 and 3
W9 - Jumper must be OFF
S1 - Jumper on 6

Drive Connectors:

J1 - 34-pin connector that carries control signals to the hard disk drives.
J2 - 20-pin data connector for drive 1.
J3 - 20-pin data connector for drive 2.

NOTE: The ST238 controller can support two hard disks, but BOTH must be Seagate ST238 drives or other hard disk drives that can support a RLL controller.

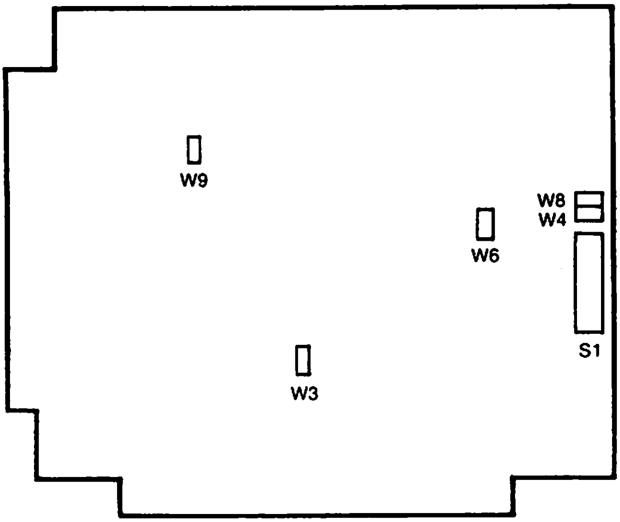


Figure 6: The ST238 Controller

Installation Procedures for the ST238 Controller

1. Attach the 34-pin cable to J1 on the controller. The connector is keyed to prevent you from attaching the cable backwards. The colored stripe on the cable should be attached to pin 1 of the J1 connector.

2. Attach the 20-pin data cable to J2 (for drive 1) or J3 (for drive 2). The colored stripe on the cable should be attached to pin 1 of the drive connector.

3. Connect the cables to the hard disk drive as shown in the following figure. Notice that the colored stripe is on the left of the connectors on the hard disk when you face the front of the hard disk drive.

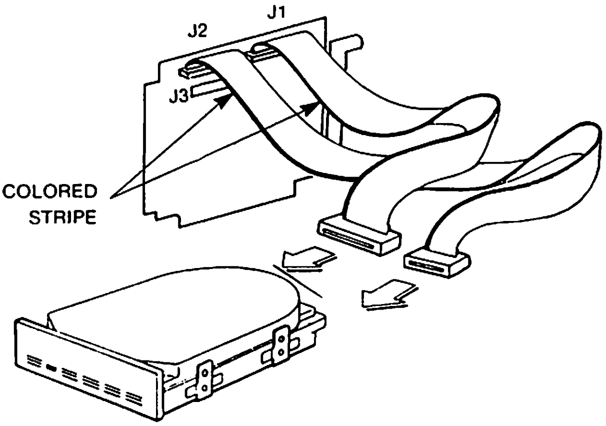


Figure 7: Connecting the Hard Disk to the Controller

4. Complete the installation according to the instructions in the Installation chapter of this manual.

Installing an Internal Hard Disk

Installing your internal or external Hard Disk Subsystem is easy when you read through these instructions to ensure a simple, safe installation. Before you install your subsystem, confirm that the settings on your controller card and hard disk are properly configured (as was shown in Figures 1 through 6).

INSTALLING AN INTERNAL HARD DISK SUBSYSTEM

Into an IBM PC, IBM XT, and IBM PC-1 (with 64K CPU)

1. Remove the hard disk drive, hard disk controller, cables, mounting hardware, power supply (optional), and Everex System's software diskette from the carton. Do NOT dispose of the packaging materials, boxes, or payment receipts.

NOTE: The warranty will be void if the products are returned to Everex Systems without the original packaging and proof of purchase. Please read the warranty card included in the packaging. The warranty will not take full effect until the enclosed registration card has been filled out and returned to Everex.

2. Turn OFF your computer.

3. Disconnect all power cords from the wall outlet or power source, and from the computer. Disconnect all other cables attached to your computer.

4. Remove the computer's cover by unscrewing the screws which hold it in place, and gently sliding it off of the computer's body. If you are unsure how to do this, refer to the appendix on *Removing the System Unit's Cover.*

5. Attach the drive ribbon cables to the connectors on the hard disk controller. Align the colored stripe on the ribbon cables with pin 1 of the drive connectors. (Refer to figures 8 and 9.)

   Everex Controller Drive Connectors:

   J1 - Attach the 34-pin hard disk drive control cable.

   J2 - Attach a 20-pin hard disk data cable for drive 1.

   J3 - Attach a 20-pin hard disk data cable for drive 2, if applicable.

   J6 - 34-pin floppy disk control cable (ONLY on the EV-390 controller).

Pin 1 is usually on the left side of the drive connectors. Therefore, with the component side of the controller facing you, the colored stripe on the cables attaches to the left side of the connectors. To confirm the location of pin 1, it is always identified on the solder side of the controller with a square around it. Check to be sure that all pins are firmly inserted into the cable's connector. Do not force the cable connector into the controller's connectors.

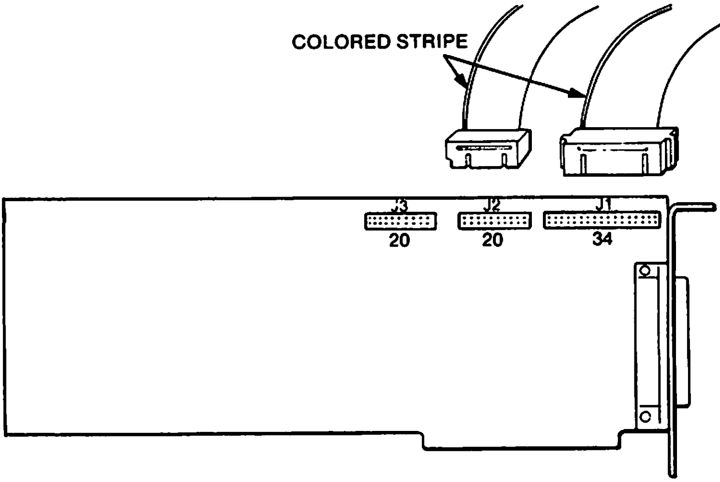


Figure 8: Positioning the Cables

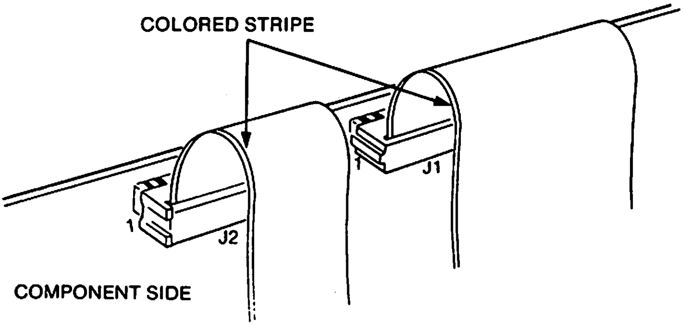


Figure 9: Connecting the Cables

NOTE: If you have an EV-390 hard disk + floppy controller in your system, refer the appendix on the *Hard Disk + Floppy Controller* for instructions on attaching an additional 34-pin daisy chain cable to the floppy drive.

6. In the left, rear section of the computer, you will see accessory expansion slots located on the rear panel. (See Figure 10).

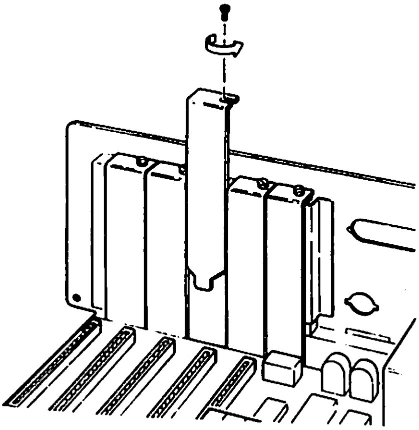


Figure 10: Removing the Slot Cover

The best expansion slot for the Hard Disk controller board is the long slot next to the floppy disk controller. (See Figure 11). Using a screwdriver, remove the screw that connects the slot cover to the expansion slot. (Figure 10). Keep this screw in a safe place as it will be used to secure the Hard Disk controller.

7. Install the hard disk controller into the vacant expansion slot in your IBM PC. Hold the top edge of the hard disk controller, and slide its mounting bracket down the back panel of the computer until the gold contacts on the bottom of the hard disk controller just touch the mating connector on the bottom of the computer.

8. Press firmly down until the gold contacts are deeply engaged in the connector. The board should be level and should not be touching any other boards or components. (Figure 11).

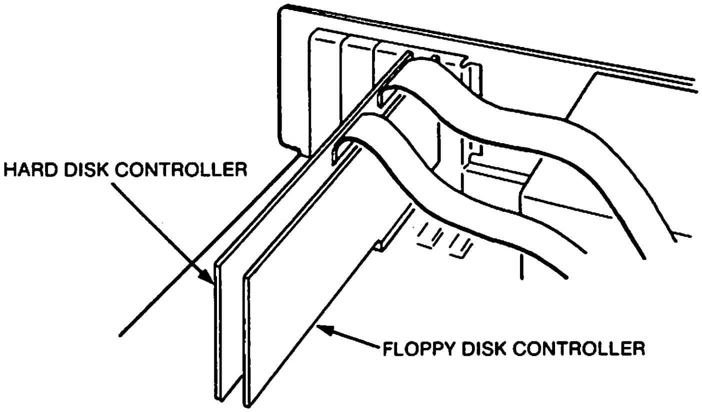


Figure 11: Installing the Controller

9. Insert the slot cover screw that you removed earlier, and tighten it to secure the controller's mounting bracket.

10. Connect the mounting bars onto the disk drive using the flat head "A" screws as shown in Figure 12.

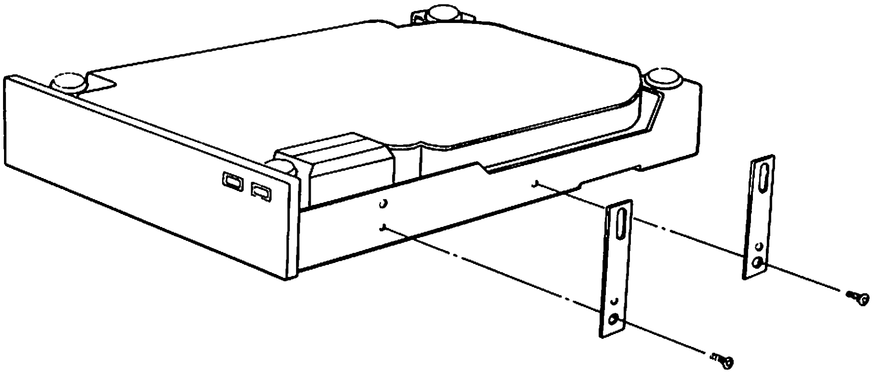


Figure 12: Connecting the Mounting Bars

11. Slide the hard disk halfway into the drive space with the metal cover face up. Connect the cables attached to the controller board to the hard disk drive as shown in Figure 13. The colored stripe on the cables should be on the left side as you are facing the front of the drive.

12. Connect the 4-pin power cable from a power source (either the computer's power supply or an additional power supply) to the hard disk drive.

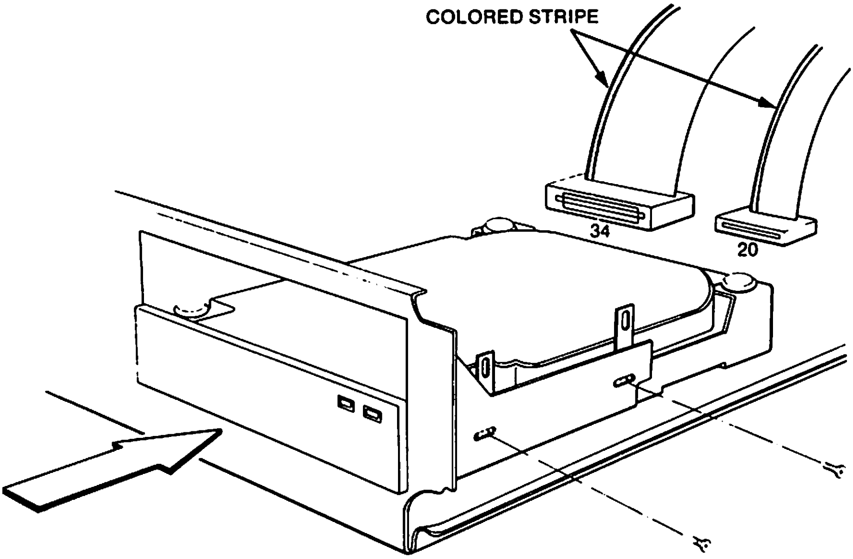


Figure 13: Installing the Hard Disk Drive

13. Slide the hard disk drive completely into the drive slot, and connect the disk drive mounting bars to the PC chassis using the two pan head screws provided. (See Figure 13).

    Note: Do not over-tighten the screws or use screws that are longer than those provided, doing so may cause damage to the circuitry.

14. Insert the half-height bezel into the open space, (if applicable).

15. DO NOT change the switch settings on the computer system unless you have removed a floppy disk drive and installed the hard disk in the floppy space. If you did this, you must reset the computer's switch settings for one floppy. For the IBM PC I system or equivalent, with maximum onboard memory of 64K, the BIOS ROM does not recognize a hard disk subsystem. Everex Systems has provided a solution by modifying the software. Please refer to the *PC 1 Installation* sub-section before continuing any further.

16. Reinstall the computer's cables.

17. Turn the computer's power ON .

18. Format your hard disk drive by following the instructions detailed in the *Formatting the Hard Disk Drive* section of this manual.

19. When the hard disk drive is tested and working properly, reinstall the computer's cover. You can slide the cover on without lifting the computer. Insert and tighten all the screws you removed earlier.

HARD DISK INSTALLATION IN AN IBM PC-1 (THE SOFTWARE PATCH)

Some early models of the IBM PC (the PC-1) do not contain the ROM BIOS codes which allow you to boot IBM PC DOS directly from a hard disk. For these systems, a software patch is necessary for the PC to recognize the hard disk drive. Everex Systems provides you with such a software patch. The patch is called EVEREX1.EXE and it is on the Everex Utility Diskette.

On the left hand side of your IBM PC system board (near the speaker) is a white label which indicates the model number of the PC. If it is labeled "16K - 64K CPU," you have a PC 1; if it is labeled "64K - 256K CPU," you have a PC 2.

To Install the Everex Patch:

1. Boot-up your system with your DOS diskette. After booting-up, remove the DOS diskette and replace it with the Everex utility diskette.

2. Type: EVEREX1 [ENTER]

   NOTE: It should take approximately 20 seconds for the program to finish. You will need to reinsert your DOS diskette to complete the patch.

3. The software patch must be run each time the system is turned ON if the system is to boot-up to recognize the hard disk. To simplify this procedure, the software patch can be loaded into an AUTOEXEC file on the DOS system diskette. This file will then automatically run the patch when the computer is turned on. To install the patch:

   a. Boot up with DOS.

   b. Type: COPY CON: AUTOEXEC.BAT [Enter]

   c. Type: EVEREX1 [Enter]

   d. Press the F6 key [Enter]

Note: The DOS system diskette with the AUTOEXEC file must be in your floppy disk drive when you turn the computer on; the PC will then boot-up to the hard disk.

Now continue with the formatting procedures which are described in the section called, *Formatting The Hard Disk Drive.*

INSTALLING TWO INTERNAL HARD DISK DRIVES INTO AN IBM PC, IBM XT OR COMPATIBLES

Refer to the *Note on Terminating Resistors* in this manual to ensure that your hard disk drives are configured properly before installing a second drive.

Requirements for Installing Two Hard Disk Drives:

- One 34-pin daisy chain cable
- Two 20-pin data cables.
- Additional power supply (if your existing power supply is less than 130 watts).
- "Y" power cable

If the controller is used to operate two hard disk drives, you must use a 34-pin daisy chain cable to connect the two drives to the controller. When connecting two drives with this cable, the disk designated as drive #1 should have its select jumper/switch set to Drive #1. The disk drive designated as Drive #2 should have its select jumper/switch set to Drive #2.

NOTE: If the external hard disk drive is your second drive, please refer to the appendix called *One Internal and One External Hard Disk Drive.*

Installation Procedures

1. Before installing the second drive, make sure the jumpers on the hard disk controller are set properly for a second drive. If you need to, refer to the controller configurations, and Figures 3 through 6 for instructions.

2. Set the drive select switches on the second drive. If necessary, refer to the hard disk drive configurations and Figure 1.

3. Connect the first 20-pin cable to the J2 connector and the second 20-pin cable to the J3 connector pins on the controller. Connect the 34-pin daisy chain cable to the J1 connector pins. (See Figure 14).

4. If it is possible, place the two hard disk drives side by side on top of the floppy disk drive or the tape drive following the instructions outlined in the installation section of this manual. Stacking the two hard disk drives on top of each other may cause the system to overheat.

5. Connect the 20-pin and 34-pin cables to the hard disk drives. The cable attached to J2 connects to Drive 1, and the cable attached to J3 connects to Drive 2. Make sure that the colored stripe on the cables is on the left side as you face the front of the drive. The end connector of the 34-pin daisy chain cable should be connected to the second drive. (See Figure 14).

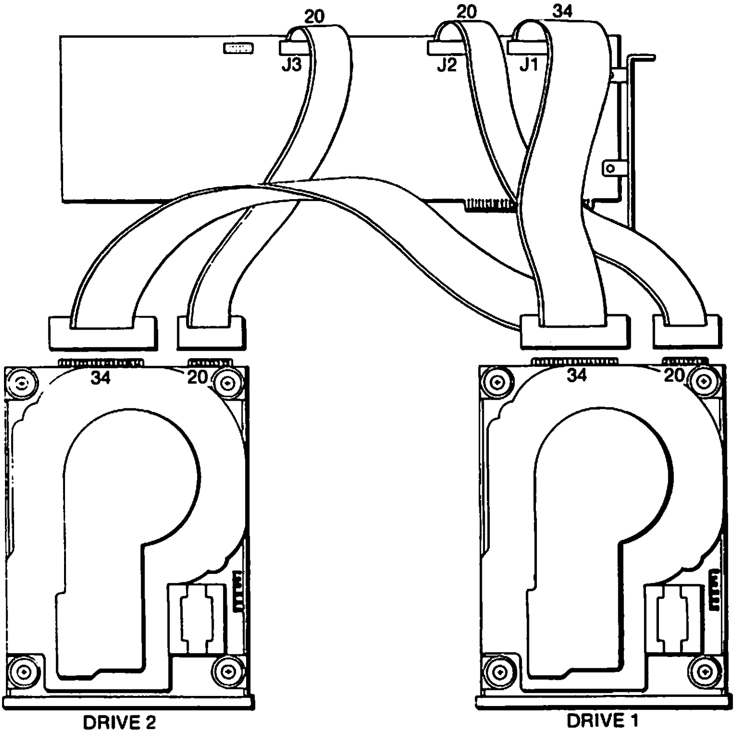


Figure 14: Installing Two Hard Disk Drives

6. Connect the two drives to the power supply with the 4-pin cables from the power supply (use a "Y" power cable if necessary).

7. Reinstall the cables and turn the computer ON.

8. Now continue with the formatting procedures that are described in the section titled *Formatting The Hard Disk Drive.*

   NOTE: The second drive will be recognized as "D".

9. When the drives are tested and working, reinstall the computer's cover.

Installing an External Hard Disk

There are three versions of the external hard disk drive:

1. The first version is two external hard disk drives in a full-height chassis with its own power supply.

2. The second version is an external hard disk drive in a half-height chassis with its own power supply.

3. The third version is an external hard disk drive in a half-height chassis that does not have a power supply built in the external chassis. In this version the power supply comes from the internal power of the IBM PC/XT, therefore, make sure that the power is adequate enough to support a hard disk. A "Y" power cable is required for this kind of hard disk drive.

NOTE: If the external hard disk drive is your second hard disk, please refer to the Appendix called ***One Internal and One External Hard Disk Drive.***

INSTALLING A HARD DISK DRIVE CHASSIS:

1. Remove the hard disk drive chassis, the hard disk controller card, cables, power supply (optional), and Everex software diskette from the carton. Do NOT dispose of the packaging materials, boxes, or payment receipts.

NOTE: The warranty will be void if the products are returned to Everex Systems without the original packaging and proof of purchase. Please read the warranty card included in the packaging. The warranty will not take full effect until the enclosed registration card has been filled out and returned to Everex.

2. Turn OFF your computer.

3. Disconnect all power cords from the wall outlet or power source, and from the computer. Disconnect all other cables attached to your computer.

4. Remove the computer's cover by unscrewing the screws which hold it in place, and gently sliding it off of the computer's body. If you are unsure about this procedure, refer to the appendix called *Removing the System Unit's Cover*.

5. Check the Hard Disk controller card to make sure that "SW1" is configured correctly for your system before you install the controller card. (Refer to Figures 3 through 6 in the chapter on *Hard Disk Controller Configuration* in this manual).

6. In the left, rear section of the computer, you will see five (for the PC) or eight (for the XT) accessory expansion slots located on the rear panel. (See Figure 15).

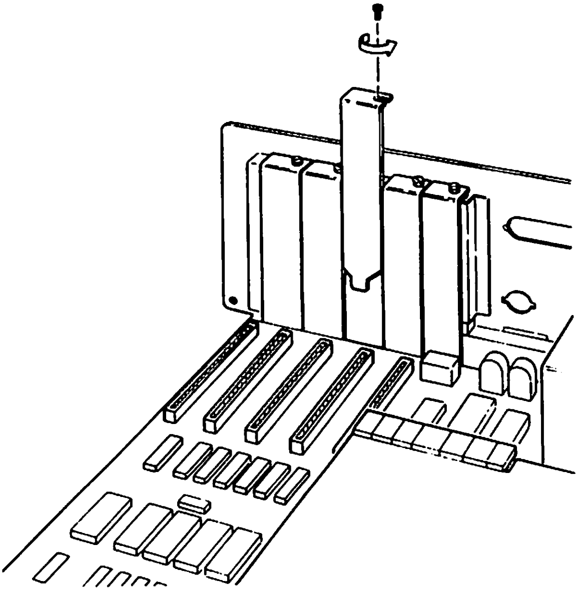


Figure 15: Removing the Slot Cover

The best expansion slot for the Hard Disk controller is the long slot next to the floppy disk controller (See Figure 16). Using a screwdriver, remove the screw that connects the slot cover to the expansion slot. (Figure 15). Keep this screw in a safe place as it will be used to install the Hard Disk controller.

7. Install the hard disk controller into the vacant expansion slot in your IBM PC. Hold the top edge of the Hard Disk controller, and slide its mounting bracket down the back panel of the computer until the gold contacts on the bottom of the Hard Disk controller just touch the mating connector on the bottom of the computer.

8. Press firmly down until the contacts are deeply engaged in the connector. The board should be level and should not be touching any other boards or components. (See Figure 16).

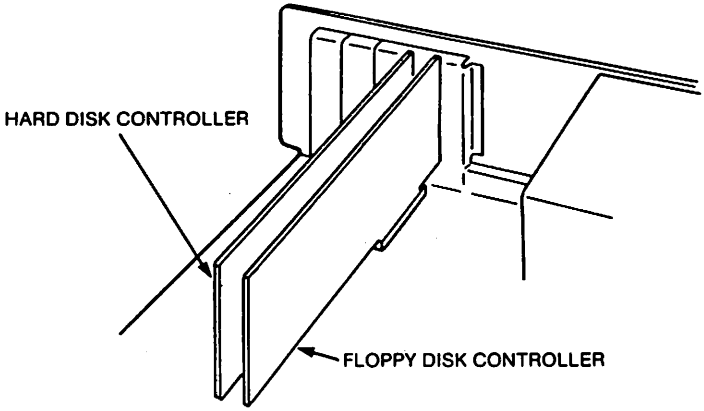


Figure 16: Installing the Controller

9. Insert the slot cover screw that you removed earlier, and tighten it to secure the controller's mounting bracket.

10a. If you have an external hard disk drive in a full-height or half-height chassis with its own power supply, the power plug in the external chassis will have been assembled for you in production. Go on to step 11.

b. If you have an external hard disk drive in a half-height chassis without its own power supply, connect the 4-pin power cable from the IBM PC/XT power source to the piggy-tail power connector on the Hard Disk controller board. Go on to Step 11.

c. If you do not have an unused power cable, you can disconnect the existing power cable from the floppy disk drive and use a "Y" power cable. In essence you will be splitting the IBM PC/XT's power source between two outlets. Plug the "Y" power cable into the IBM's power source. Then connect one of the 4-pin connectors into the floppy drive, and the other 4-pin connector into the piggy-tail power connector on Hard Disk controller. (See Figure 17).

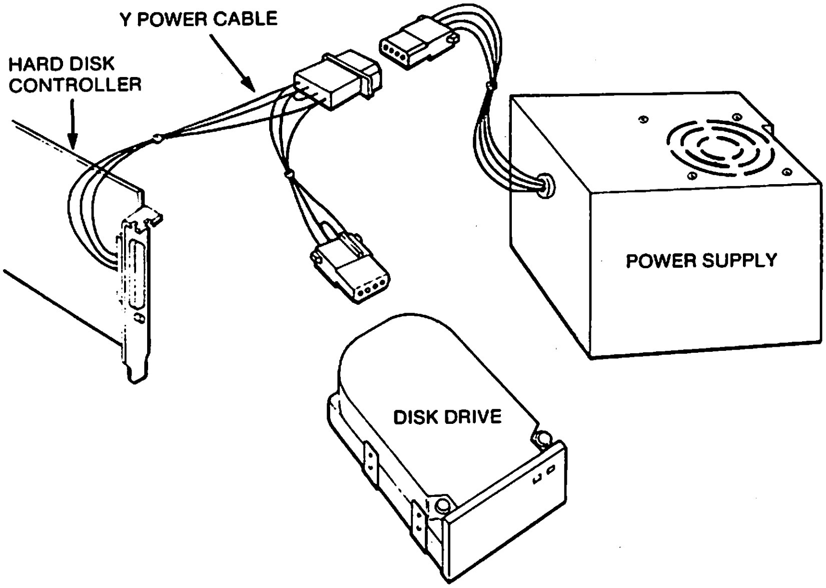


Figure 17: Connecting the Y Power Cable

11. On the mounting bracket of the Hard Disk controller is a 37-pin connector. This external connector joins the hard disk controller to the hard disk chassis.

Plug one end of the shielded round cable into the external connector on the hard disk chassis. The other end of the shielded round cable attaches to the external connector on the mounting bracket of the hard disk controller. Tighten the screws to ensure that the connectors are properly joined. (Refer to Figure 18A or 18B depending upon the type of external chassis you have).

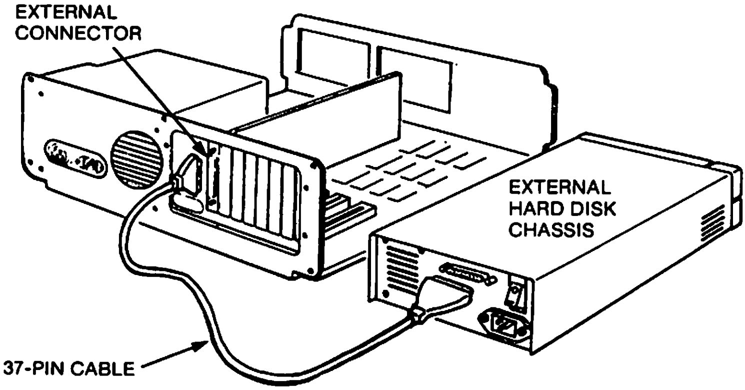


Figure 18A: Connecting the Controller to a Chassis with a power supply

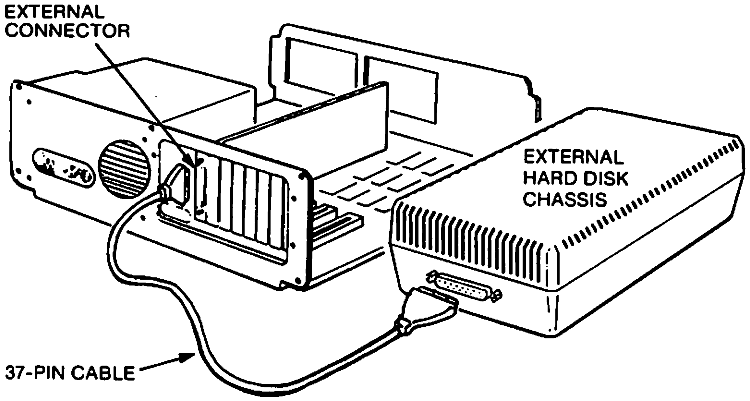


Figure 18B: Connecting the Controller to a Chassis without a Power Supply

NOTE: A hard disk chassis without a power supply does not have an AC power connector. The power comes from the internal power supply of the PC/XT.

NOTE 2: Make sure to use the proper shielded cable that was shipped with the external drive.

12. Reinstall the computer's cover and cables. You can slide the cover on without lifting the computer. Insert and tighten all the screws you removed earlier.

13. If you have a hard disk drive with a power source in the external chassis, connect the AC power cord to the outlet on the external chassis, and the other end into an AC wall outlet. (Figure 19).

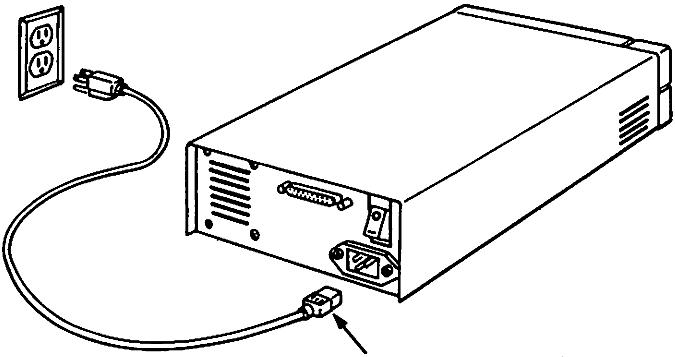


Figure 19: Connecting the Power Cord to the External Chassis and Wall Outlet

14. Turn the external chassis's power ON if it has a power supply.

15. Turn the computer's power ON.

16. Now continue with the formatting procedures detailed in the *Formatting The Hard Disk Drive* section of this manual.

INSTALLING TWO EXTERNAL HARD DISK DRIVES

Additional requirements for installing a second hard disk drive:

- Two external hard disk drives must be encased in a full-height chassis with its own power supply
- One 34-pin daisy chain cable (with 3 connectors)--inside the chassis
- Two 20-pin cables--inside the chassis
- An EV-301 cable connector card--inside the chassis

Installation Procedures:

The procedures for installing a chassis with 2 external hard disk drives are exactly the same as the procedures for installing 1 external hard disk drive.

Review the installation procedure that occurs in Step 5 of the section on installing 1 external hard disk drive. Make sure "SW1" on the hard disk controller is configured properly for a second drive. (See Figures 3 through 6).

Follow the formatting procedures as normal for your second drive. (These are explained in detail in the following section).

NOTE: The second drive will be recognized as "D".

Formatting the Hard Disk Drive

Unlike diskettes, your hard disk requires two types of formatting: physical formatting and logical formatting. The physical format arranges the structure of the information on the disk media and marks the bad sectors on the hard disk. The logical format prepares the drive with DOS specific information. This section also contains information on how to partition the hard disk. Partitioning a hard disk drive divides the disk into sections called cylinders. This procedure must be done before the hard disk can be logically formatted.

NOTE: With every hard disk drive the manufacturer provides a list of the locations of the bad tracks. The list is usually a computer print-out which comes taped to the hard drive itself. This list references bad tracks by cylinder and head number. You will need the bad track list to format your hard disk drive. KEEP THIS LIST.

PHYSICAL FORMATTING

1. Insert your DOS diskette into the floppy drive and boot-up the system.

   NOTE: We recommend using DOS 3.0 or higher for 20MB+ drives.

2. When the *A>* prompt appears on the screen, take out the DOS diskette and insert the Everex utility diskette. At the prompt type:

   FMTDRIVE [ENTER]

   REMEMBER: For the IBM PC I, you must use the EVEREX1 program before running FMTDRIVE.

   The physical format of the drive will then begin. Follow the menu instructions as they appear on the screen referring to the instructions below if any complications arise. (The words which will appear on the screen are in italics).

   Enter drive number (1 or 2, x to exit)

   This is asking which hard disk drive you wish to format. Press 1 if you are formatting your first hard disk; press 2 if you are formatting the second hard disk.

   Note: If you have two hard disks, you will need to format each one separately!

   Enter interleave (1-6, CR for default, x to exit):

The hard disk reads information faster than the computer can process it. The interleave factor tells the controller card not to record information on each consecutive sector thus allowing the computer system time to process all of the information on the first sector before it starts reading the next sector.

The recommended interleave factor for the IBM PC and XT is 5; if you have either one of these systems, you need only push the carriage return key.

For the remainder of the operation, follow the questions and explanations as they appear on the screen.

After the formatting operation is completed, proceed to the section on *Hard Disk Partitioning*. (We suggest that you read Chapter 3: "Preparing Your Fixed Disk" in your IBM DOS manual before proceeding).

HARD DISK PARTITIONING

FDISK

A hard disk is divided into sections called cylinders. The number of cylinders and their sizes can vary depending on the size of your hard disk. A 10-megabyte disk contains 305 cylinders, and each cylinder contains 34,816 bytes of information. You can partition your hard disk so that DOS uses the whole physical disk, or shares part of the hard disk with another operating system, such as CP/M or UNIX.

1. After booting up with DOS (be sure that the DOS diskette is in drive A), type:

   ```
   FDISK                                   [ENTER]
   ```

2. You should then read the following:

```
IBM Personal Computer
Fixed Disk Setup Program Version 1.00
(C) Copyright IBM Corp. 1983

FDISK Options

Current Fixed Disk Drive:1

Choose one of the following:

   1. Create DOS Partition
   2. Change Active Partition
   3. Delete DOS Partition
   4. Display Partition Data
   5. Select Next Fixed Disk Drive
```

Note: The ***Current Fixed Disk Drive*** **message and "selection 5" will appear if you have more than one hard disk connected to the controller.**

If you wish to partition your disk for DOS only, then select option #1.

If you wish to partition your disk for non-DOS operating systems or for multiple DOS systems, then select option #3. (After this is completed, you will return to the menu and continue with option #1).

If you have a high-capacity drive (40 Mb or more) refer to the documentation on *Everstore - Logical Fixed Disk Device Driver* for information on creating logical drives.

LOGICAL FORMATTING

We recommend using PC DOS 2.1 or a later version to logically format 10MB hard disks, and 3.1 to logically format 20MB and larger hard disks.

The switches in the computer system board are used for selecting floppy drives only. The drive letter for the hard disk drive will be the one after the floppy drive(s). Therefore, if your computer is set for 1 or 2 floppy drives, the hard disk will be recognized as Drive C.

Note: After booting-up with DOS in drive A, type: DIR C: (If you already have configured Drive C, then type D:DIR). The system should not be able to read any files since it has not been logically formatted. If an *INVALID DRIVE* error message appears, then you should re-check your installation and perform the physical format routine.

For the following procedure, you will need to use the DOS diskette.

NOTE: If you are using DOS 2.0 or 2.1, the FORMAT.COM program on DOS may not format a hard disk over 10MB. If this occurs, the DOS Error Message "Bad track 0 disk unsuitable for system disk" appears on the monitor's screen. To remedy this, run the the FIXFMT program, which can be found on the Everex utility diskette, to patch FORMAT.COM. However, if you are able to successfully complete the FORMAT program on a disk larger than 10 MB, the disk is ready for use.

Logical Format with DOS 2.0 or 2.1

1a. Make a backup copy of your DOS 2.1 diskette.

b. Copy the file FIXFMT from the Everex utility diskette to your DOS 2.1 backup diskette.

```
FIXFMT                                  [ENTER]
```

c. When running the FIXFMT file, a file called LFORMAT will be generated. Use this program to logically format your drive. Type:

```
LFORMAT C:/S/V                          [ENTER]
```

Continue on to Step 2 of the Logical Format Instructions.

Logical Format with DOS 3.0 or 3.1

1a. With the DOS diskette in drive A type:

```
FORMAT C:/S/V                                  [ENTER]
```

NOTE: ***C:*** **stands for your hard disk drive.** ***/S*** **transfers DOS onto the hard disk drive. (It must be specified in order to boot up from the hard disk.)** ***/V*** **installs a volume label.**

b. Press any key to begin formatting "C".

2. When the logical format is complete (please be patient while the drive is formatting) the following message will appear on the screen:

Format Complete
System Transferred
Volume label (11 characters, enter for none)?

Enter the desired volume name for your drive (this may contain up to 11 characters), or press the carriage return to default.

3. Remove the DOS diskette from Drive A or simply open the drive door. Press the CTRL-ALT-DEL keys simultaneously. Your system should boot up from Drive C.

4. Congratulations. Your hard disk is now ready for use. Before you enter valuable data into the disk drives you should familiarize yourself with some of the utility programs provided with DOS and by Everex Systems in the next section.

5. If you have problems, please refer to the Appendix on *Questions and Answers*.

6. If you want to install two hard drives, please refer to the *Installing Two Hard Disk Drives* section.

For Hard Disks That Are Already Formatted:

If you want to upgrade your hard disk format from DOS 2.0 to 2.1 or from 2.1 to 3.0, you must run the DOS FORMAT program again. REMEMBER: Any time that the formatting program is run, all data on your disk will be destroyed. Make sure you back up all your data before formatting.

BACKUP UTILITY

The backup utility provided by IBM DOS is used for backing up one or more files from the hard disk onto diskettes.

To Back Up to the Root Directory:

```
Type:    BACKUP  C:[Directory Name] A:
```

To Back Up a Sub-directory:

```
Type:    BACKUP C:\[Sub-directory Name] A:/S
```

To Back Up All the Information in the Hard Disk:

```
Type:    BACKUP C: A:/S
```

To Back Up Only the Files That Have Been Modified Since Last Back Up:

```
Type:    BACKUP  C:[Directory] A:/S/M
```

To Back Up Only the Files That Have Been Modified After A Certain Date:

```
Type:     BACKUP C:[Directory] A:/D:Date
```

RESTORE UTILITY

To Restore the Data Back To the Hard Disk:

(with the backup diskette in the floppy drive A)

```
Type:     RESTORE A: C: [Directory]
```

For further information, please read your DOS manual.

SHIPDISK UTILITY

Whenever you need to move your system or hard disk, you should always lock the read/write head of your drive to the shipping zone area. This will position the head above an area void of data. This is similar to securing the tone arm of a stereo turntable. Use the SHIPDISK program which is found on the Everex Utility diskette.

NOTE: Some of the Seagate Hard Disks, the ST4026, the ST4038, and the ST4051 do not require the SHIPDISK program when moving the system. The head will automatically park above an area void of data when the system is powered down.

1. Insert the EVEREX Utility Diskette into a floppy drive.

   Type: SHIPDISK [ENTER]

2. The program will ask you for a drive number (1-8). Enter 1 if you have one hard disk. If you have two hard disks, run the program twice -- the first time with drive 1, second time with drive 2.

3. When the light of the hard disk stops flickering, a *disk is ready to ship* message will appear. The hard disk drive is ready to be moved as the read/write head is now parked.

Appendix I: Removing the System Unit's Cover

It is easy to remove the cover of your system. Before you begin, clear the area around the system so that you have plenty of room to work.

1. Remove the screws that hold the cover in place, and put them in a safe place.
2. With the front of the unit facing you, carefully pull the cover of the unit towards you. When the cover stops sliding towards you, tilt it up slightly and pull it away from the system.

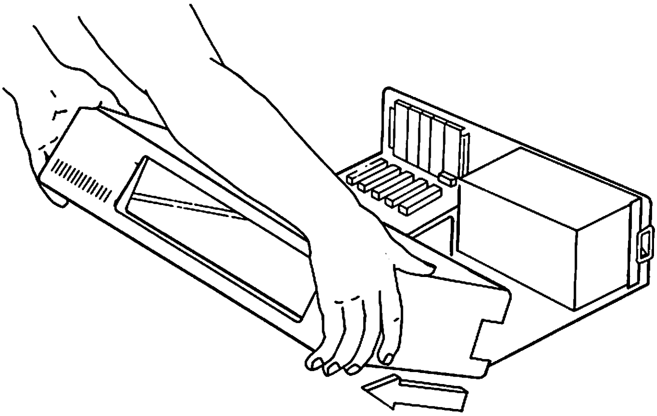


Figure 20: Removing the System Unit's Cover

Appendix II: Questions and Answers

Q: Do I have to change the dip switch settings on the CPU board for my hard disk?

A: No, do not change any switches. If you have two floppy drives though, the switch should be set for two drives.

Q: I cannot connect the cables to the header. Something in the connector is blocking it. What should I do?

A: The connector is specially keyed to avoid being installed incorrectly. Double check the installation procedures. Also, check whether pin 3 of the jumper header on the controller has been clipped. If not, cut pin 3 of both connectors (34 pin and 20 pin).

Q: When I boot up, the message *1701 hard disk not recognized* comes up. What should I do?

A: 1701 means the drive has not been attached to the system.

i) Remove the screws that secure the drive to the chassis, and slide the drive out of the PC or XT.

ii) Unplug all cables and re-connect them again. Make sure that the colored stripe on the cables is aligned with pin 1 of the drive connectors, and that all the pins are firmly inserted into the cables.

iii) Check to be sure a power cable from the power supply has been properly connected to the hard disk drive.

Q: After turning on the computer system, the motor of the drive is not spinning? Why is that?

A: Check to ensure that a power cable from the power supply has been connected to the hard disk drive itself.

Q: After I perform a logical format, a *bad track 0* message appears, why is that?

A: You should repeat the FMTDRIVE routine. If you have a 20MB drive, refer to the "LOGICAL FORMAT" section of this manual.

Q: Why am I getting a *invalid drive specification* error message?

A: Check whether you have performed the FMTDRIVE, partition and DOS logical format routines correctly.

For IBM PC 1 (with maximum on board memory expansion of 64K RAM) or equivalent IBM compatible machines, you must run EVEREX1 every time you boot up from DOS.

Also, try Directory D, E, and F if you have changed the dip switch settings.

Q: After formatting, my drive shows a lot of bad tracks. Why is that?

A: You should run the FMTDRIVE program again. If there are still a lot of bad tracks, you might check your power supply and requirements. Try taking out some of the expansion cards from the system reducing the power requirements to determine whether power is a problem.

Q: Why does the DOS message *drive not ready* appear periodically ?

A: It is most likely because of an inadequate power supply. The system is being overloaded with too many cards. You should remove any unused expansion cards or you may need to purchase an additional power supply.

Q: Do I need an additional power supply if I have two floppy drives and one hard disk drive configured in the same IBM PC?

A: *Yes, you should install an additional power supply. Even though there may not be any problem initially, the system may fail occasionally when there is a power surge.*

Q: When I boot up directly from the hard disk, the message *command interpreter missing* appears. Why is that?

A: *When you performed the logical format, you forgot to include /S. Consequently, DOS has not been transferred to the hard disk drive. Re-format the drive with the command FORMAT C:/S/V or "SYS C:" from your floppy DOS diskette.*

Q: Why is it that my hard disk can only be recognized as Drive E?

A: *Check whether you have installed other drivers in your CONFIG.SYS. Remove them and the drive will be recognized as C. Also make sure that your system switch is set for 2 floppy drives.*

Q: After running the FMTDRIVE program, I get an *error 3* message. What is that?

A: Please refer to appendix titled FMTDRIVE ERROR MESSAGES.

Q: What should I do if I want to move my system to another location?

A: Before moving the system, you should always run the SHIPDISK program which is provided on the Everex Utility diskette. Please refer to the SHIPDISK program in the "UTILITY PROGRAMS" section of the manual. The Seagate 4000 series of drives do not require SHIPDISK since they have automatic head parking.

Q: Why is it that after exchanging controllers, the drive does not work?

A: A unique physical format is required for each type of controller. That means, if a controller is replaced by a different type of controller, the drive has to be physically re-formatted for that particular controller. Please refer to the "PHYSICAL FORMAT" section of the manual. Note that all your data will be erased during the process so be sure to backup your data before performing the physical format operation.

Q: Why is it that my system will only recognize 10MB of my 20MB hard disk drive?

A: *You could have 1) changed the switch settings on the controller card to 10MB; in that case refer to the Hard Disk Controller Configuration section for the correct jumper settings; 2) not run the FIXFMT program to format a hard disk over 10MB: in this case, refer to the subsection in this manual called LOGICAL FORMATTING; 3) not run the FDISK program. When running the FDISK program, delete the DOS partition first (option 3) and then recreate the DOS partition using option 1.*

Q. Why do I get a *not enough memory* error when I try to format my drive with DOS 2.0?

A. *If you are using DOS 2.0 with 512K or more of memory, the DOS 2.0 format program will not work. Try decreasing the memory size to less than 512K or using DOS 2.1 or 3.0.*

Appendix III: FMTDRIVE Error Messages

ERROR (refer to the next paragraph for a detailed message)

1 (xx00) = Parameter Block
2 (xx00) = Recalibration Failed
3 (xx00) = Format Failed
4 (xx00) = Parameter Block
5 (xx00) = Verification of Sector 0 Failed

Where (xx) is:
0F ; Sense Operation Failed
08 ; Undefined Error Occurred
80 ; Attachment Failed to Respond
40 ; Seek Operation Failed
20 ; Controller Has Failed
11 ; ECC Corrected Data Error
10 ; Bad ECC on Disk Read
0B ; Bad Track Flag Detected
09 ; Attempt to DMA Across 64K Boundary
07 ; Drive Parameter Activity Failed
05 ; Reset Failed
04 ; Requested Sector Not Found
02 ; Address Mark Not Found
01 ; Bad Command Passed to Disk I/O

Error messages are in hexadecimal; errors can be combined (e.g. 3000 is a combination of 2000 and 1000). According to the error message table, this would mean "Bad ECC on Disk Read" and "Controller has Failed."

Appendix IV: Hard Disk & Floppy Controller

INSTALLATION OF THE HARD DISK + FLOPPY CONTROLLER

Follow the Installation Procedures outlined in the Installation Chapter of this manual. The only change required by the full-size hard disk/floppy controller (EV-390) is the addition of a 34-pin daisy-chain cable.

Instructions:

1. Remove the floppy disk controller card which currently resides in your system.

2. Attach one end of the 34-pin daisy-chain cable to J6 (for 2 floppy disk drives A & B), or J5 (for floppy disk drives C & D).

   NOTE: IBM ROM BIOS does not support 4 floppy disk drives.

   The daisy-chain cable is keyed so that you cannot attach the cable backwards. The untwisted end of the cable should be attached to the J6 connector. Align the colored stripe on the cable with pin 1 of the drive connector. The colored stripe will then be on the right as you face the component side of the controller.

3. The middle connector on the daisy-chain cable attaches to floppy disk drive B. (Figure 21).

4. The other end of the daisy-chain cable (the end with the twist in the cable) attaches to floppy disk drive A. (Figure 21).

   Check to be sure that all pins are firmly inserted into the cable's connector. Do not force the cable connector into the controller's connectors.

   Continue with the Installation procedures outlined in the Installation chapter of this manual.

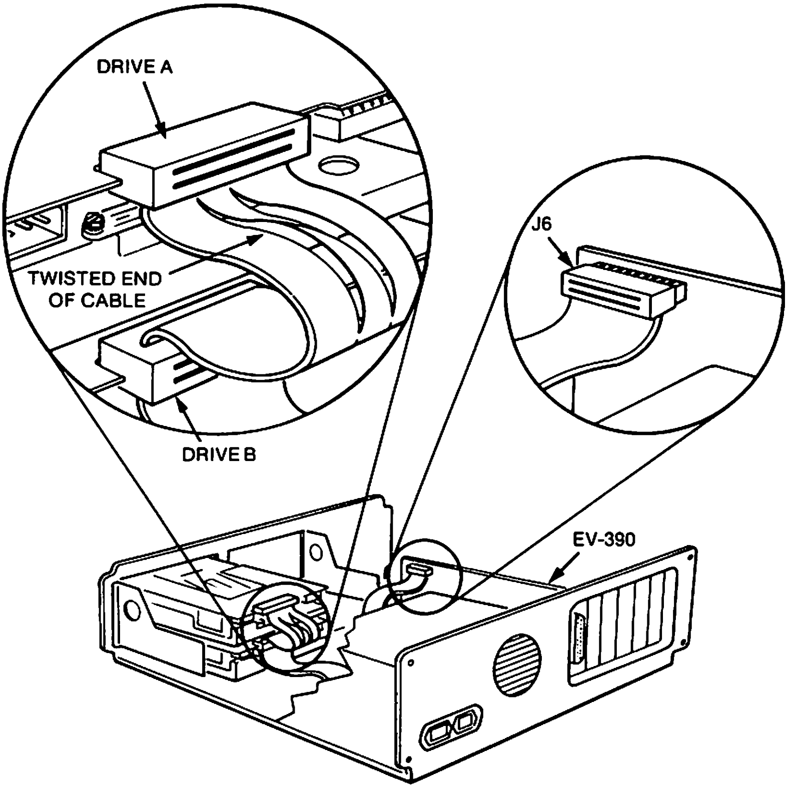


Figure 21: Installing the Hard Disk + Floppy Drive Controller

Appendix V: One Internal and One External Hard Disk Drive

If the external hard disk drive is your second hard disk, you will need to reconfigure the internal hard disk as physical drive 2 since the external hard disk is configured as physical drive 1.

NOTE: Make sure you do not format your original internal hard disk drive! Doing so will erase all the data on the drive.

Instructions:

1. Turn the power on the computer OFF.

2. Change the drive select switch on the internal hard disk drive so that it is configured as physical drive 2. You will need to move the jumper over. Please refer to the chapter on *Hard Disk Drive System Configuration* and figures 1A & 1B for more information on this procedure.

3. Change the 20-pin data cable from J2 to J3 (from the drive 1 connector to the drive 2 connector) on the hard disk controller board.

4. Format the external hard disk drive as drive C. The computer will boot up from the external hard disk drive. To confirm which drive is formatting, observe the hard disk drive access lights. Make sure the light on the external hard disk drive is on, and the light on the internal drive is off.

5. The internal hard disk drive will be recognized as physical drive 2 (D), and the external drive as physical drive 1 (C).

NOTE: Do not remove the cover of the external hard disk chassis. Exposed wires in the chassis can be dangerous.

Appendix VI: Hard Disk Subsystem specifications

HARD DISK CONTROLLER DESCRIPTION

The Hard Disk Controller is designed to interface up to two 5.25 inch Winchester Hard Disk Drives. The Winchester Hard Disk Drive signals are based upon the interface compatible with the Seagate Technology ST506 and ST412. The drives need not be of the same capacity or configuration. All necessary receivers and drivers are included on the board to allow direct connection to the drive(s).

The Hard Disk Controller Card is IBM PC and IBM PC/XT compatible and interfaces directly with the host bus. There are two interface buses; a 20-bit address bus to decode ROM and an 8-bit bi-directional data bus for host data, controller data and status communication. Access to the controller can be either host I/O addressing or DMA.

The Hard Disk Controller Card is based on the Winchester Controller/Formatter, the Control Processor, the ECC Support Device, on-board data separation and write precompensation circuitry designed specifically for Winchester Hard Disk Drive control.

The controller contains a 32-bit ECC polynomial for error detection and correction. It has a programmable retry control bit which enables automatic retries in the event of an error, or disables all retries. The controller supports implied seeks and overlapped seeks for buffered-step disk drives. The board resident ROM code also supports internal diagnostics.

The Controller Card has four (version 1) or five (version 2) on-board interface connectors. The connectors consist of the following: a 62-pin card edge connector for interface with the host bus (pins A1-A31 are on the component side of the board and pins B1-B31 are on the solder side of the board), a 34-pin drive control connector (J1) allowing up to two drives to be daisy chained, with the last drive being terminated with a standard 220/330 ohm terminating resistor pack, and two 20-pin drive data connectors (J2 and J3) allowing direct connection of the controller to each drive. Connector J4 on controller card version 2 is not used currently. There is also an optional 37-pin external connector on the mounting bracket of the controller that is shipped with external hard disk drives.

EVEREX HARD DISK CONTROLLER SPECIFICATIONS

Encoding Method	MFM
Cylinders Per Drive	Programmable to 1024
Bytes Per Sector	512
Sectors Per Track	seventeen 512 byte sectors per track
Head Selects	8 with WD1015-14, 16 with WD1015-24
Drive Selects	2
Data Transfer Rate	5 Mbits/sec
Write Precomp Time	12 nanoseconds
Max Cable Length:	
Control (total daisy chain)	20 ft.
Data	20 ft.

Host Interface

Type	IBM PC/XT
Connection	Plug into any expansion slot

Power

Voltage	+5VDC +/- 5% and +12VDC +/- 10%
Max. Current	depends on the model
Short size:	.35A .003A

Environmental Limits

Ambient Temperature	0 - 55 C
Relative Humidity	10% to 95% non-condensing
Altitude	0 - 3000 meters (10,000 ft.)

Air Flow at 1/4" from Component Surface

Interleave Factors

All hard disk drives in an IBM PC or XT use the default interleave factor of 5.

HARD DISK SPECIFICATIONS

- Half-height compact size; 5.25 in. form factor
- Seagate 4000 series are full-height
- Monolithic/composite MnZn read/write heads
- Industry standard ST506/ST412 interface

See Table 2 for further specifications on Seagate Hard Disk Drives.

TABLE 2

SEAGATE HARD DISK SPECIFICATIONS

	ST213	ST225	ST4026	ST4038	ST4051
Formatted Capacity	10	20	20	31.9	42.5
Heads	2	4	4	5	5
Cylinders	615	615	615	733	977
Interleave (PC)	5	5	5	5	5
Interleave (AT)	3	3	4	4	4
Platters/ Type	1/ OXIDE	2/ OXIDE	3/ OXIDE	3/ OXIDE	3/ THIN FILM
Tracks	1230	2460	2460	3665	4885
Average Access (MS)	65	85/65	40	40	40
Typical Power (W)	14.8	14.8	25.5	25.5	25.5
Write Precomp	128	300	300	300	977
Disk Type (For AT)	1	2	2	8	11

**EVEREX SYSTEMS, INC.
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